

REMARKS

This is intended as a full and complete response to the Final Office Action dated August 8, 2007, having a shortened statutory period for response set to expire on November 8, 2007. In view of the following amendment and discussion, the Applicants believe all claims are in allowable form.

CLAIM REJECTIONS

A. 35 U.S.C. §112 **Claims 7-14**

Claims 7-14 stand rejected under 35 U.S.C.112, second paragraph. In response, the Applicants have amended claim 7 and cancelled claim 8 to more clearly recite certain aspects of the invention. Accordingly, the Applicants submit that the claims 7-14 are in allowable form and respectfully request the rejection withdrawn.

B. 35 U.S.C. §103 Claims 1-5

Claims 1-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Publication No. 2003/0194495 published October 16, 2003 to *Li, et al.* (hereinafter referred to as "*Li*") in view of United States Patent No. 6,211,096 issued April 3, 2001 to *Allman, et al.* (hereinafter referred to as "*Allman*"). The Applicants respectfully disagree.

Independent claim 1 recites elements not taught or suggested by the combination of *Li* and *Allman*. *Li* was filed April 11, 2002 but was not published until October 16, 2003. Enclosed please find a declaration under 37 C.F.R. § 1.131 of inventor Francimar C. Schmitt. As noted by Ms. Schmitt, all of the experiments shown in Exhibit A1-C was conducted prior October 16, 2003, *Li*'s publication date, and were performed in the United States. As shown in Exhibit B1, numerous films (i.e., FSN-17, FSN-18) were deposited prior to October 16, 2003, and the films had desired low dielectric constant (see Declaration of Francimar C. Schmitt at paragraphs 4-12). Thus, Applicants have shown conception and reduction to practice of the invention prior to October 16, 2003 of *Li*'s publication date. Furthermore, As the inventors of both *Li* and the present application were employees of Applied Materials, Inc., at the time of their respective inventions, the inventors were obligated to assign the rights to their invention

to Applied Materials, Inc. Thus, the Applicants' invention and *Li* were commonly assigned at the time of the Applicants' invention. Since this application is filed after November 29, 1999, *Li* does not preclude patentability under the provisions of 35 U.S.C. § 103(c), as amended by the American Inventors Protection Act of 1999. See, MPEP 706.02(l)(1).

Allman teaches depositing a dielectric film with tunable dielectric constant by adding different sources during depositing. The Examiner asserts that *Allman* teaches the method of varying the proportions of oxidizing gases to help "tune" the dielectric constant of a film, citing Col. 4, Lines 33-50 and Col. 5 Lines 1-5 of *Allman*'s specification. However, the Applicants respectfully submit that *Allman* teaches different gas ratios of N₂O and O₂ gas along with different selected precursors to produce a low-k or high-k film. As pointed out by the Examiners cited in Col. 5 Lines 1-5 of *Allman*'s specification, it states that "the ratio of N₂O to O₂ in the source gas can be in the range of 1:1 to 1200:1 with a preferable setting of 200:1." Therefore, *Allman* teaches using a significant high amount of N₂O gas greater than the amount of O₂ gas, or at least equal amount of N₂O gas to O₂ gas, along with TEOS gas to produce a low-K film. In other words, the high amount of N₂O gas constitutes the most portion of the total oxygen containing gas mixture. As admitted by the Examiner, *Allman* teaches using this particular selected ratio of N₂O gas to O₂ gas to produce a low-k film.

However, *Allman* does not teach or suggest a ratio of a flow rate of the N₂O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5, as recited by claim 1. More specifically, *Allman* does not teach or suggest a ratio of N₂O gas to total oxidizing gases between about 0.1 and about 0.5, which includes a significantly different and smaller ratio of N₂O to total oxidizing gases, compared to the teaching of *Allman*. In contrast, according to the teaching of *Allman* and Examiner's assertion cited in the previous office action dated April 8, 2007, the example of the deposition cited by the Examiner having the range as claimed by the Applicants is used in combination with a selected list of precursors to deposit a high-k dielectric film. (Col. 6, Lines 14-16 and 55-60; Col. 7, Lines 5-10 of *Allman*). Moreover, the selected list of precursors as taught by *Allman* used along with this selected range for depositing high-k layer even does not include cyclic organosiloxane.

Accordingly, as discussed above, *Li* does not preclude the patentability of the present application. *Allman* does not teach or suggest using a cyclic organosiloxane along with a particular selected ratio of a flow rate of the N₂O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5 to produce a low-k film, as recited by claim 1. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicant submits that independent claim 1 and all claims depending therefrom are patentable over *Li* in view of *Allman*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

C. 35 U.S.C. §103 Claim 6

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Li* in view of *Allman* and further in view of United States Patent No. 6,582,777 issued June 24, 2003 to *Ross, et al.* (hereinafter referred to as "Ross"). The Applicants respectfully disagree.

Independent claim 1, from which claim 6 depends, recites elements not taught or suggested by the combination of *Li*, *Allman* and *Ross*. *Li* does not preclude the patentability of the present application. Furthermore, the patentability of claim 1 over the combination of *Allman* has been discussed above. *Ross* is cited by its teaching for exposing a chemical vapor deposited dielectric layer to electron mean radiation for a sufficient time. *Ross* does not teach or suggest delivering a gas mixture comprising two or more oxidizing gases comprising N_2O and O_2 to a substrate in a chamber, wherein a ratio of a flow rate of the N_2O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5. Therefore, there is no teaching or suggestion from *Ross* that would suggest to one of ordinary skill in the art to modify *Allman* in a manner that would yield delivering a gas mixture comprising two or more oxidizing gases comprising N_2O and O_2 to a substrate in a chamber, wherein a ratio of a flow rate of the N_2O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5, as recited by claim 1. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicant submits that claim 6, which depends from claim 1, is patentable over *Li* in view of *Allman* and further in view of *Ross*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

D. 35 U.S.C. §103 Claims 7-13

Claims 7-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Li*. In response, the Applicants have amended claim 7 and cancelled claim 8 to more clearly recite certain aspects of the invention.

As discussed above, *Li* does not preclude the patentability of the present application. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element. Thus, Applicant submits that independent claim 7 and all claims depending therefrom are patentable over *Li*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

E. 35 U.S.C. §103 Claim 14

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Li* in view of *Ross*. In response, the Applicants have amended claim 7 to more clearly recite certain aspects of the invention.

Independent claim 7, from which claim 14 depends, recites elements not taught or suggested by the combination of *Li* and *Ross*. As discussed above, *Li* does not preclude the patentability of the present application. *Ross* is cited by its teaching for exposing a chemical vapor deposited dielectric layer to electron mean radiation for a sufficient time. *Ross* does not teach or suggest gas mixture comprising a cyclic organosiloxane, and an oxidizing gas consisting essentially of a N₂O and a O₂ gas to a substrate in a chamber, wherein a ratio of flow rate of N₂O to a total flow rate of the N₂O and the O₂ gas is between about 0.1 and about 0.5. Therefore, there is no teaching or suggestion from *Ross* that would suggest to one of ordinary skill in the art to modify itself in a manner that would yield delivering a gas mixture comprising a cyclic organosiloxane, and an oxidizing gas consisting essentially of a N₂O and a O₂ gas to a substrate in a chamber, wherein the N₂O is delivered into the chamber at a flow rate between about 0.71 sccm/cm² and about 1.42 sccm/cm² of substrate surface, wherein a

ratio of flow rate of N₂O to a total flow rate of the N₂O and the O₂ gas is between about 0.1 and about 0.5, as recited by claim 7. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicant submits that claim 14, which depends from claim 7, is patentable over *Li* in view of *Ross*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

DOUBLE PATENTING

Claims 1-5 stand rejected under the obviousness-type double patenting as being unpatentable over claims 1, 9 and 13-14 of United States Patent No. 6,797,643 in view of *Allman*. Claim 6 stands rejected under the obviousness-type double patenting as being unpatentable over claim 1 of United States Patent No. 6,797,643 in view of *Allman* and in view of *Ross*. Claims 7-13 stand rejected under the obviousness-type double patenting as being unpatentable over claims 1, 9 and 13-14 of United States Patent No. 6,797,643 in view of *Li*. Claim 14 stands rejected under the obviousness-type double patenting as being unpatentable over claim 1 of United States Patent No. 6,797,643 in view of *Ross*. In response, the Applicants agree to file a Terminal Disclaimer under 37 C.F.R. §1.130(b) to obviate the rejection once the rejections to the claims under 35 U.S.C. §§102, 103 and 112 have been withdrawn.

CONCLUSION

Thus, for at least the reasons discussed above, Applicants submit that all claims are in condition for allowance. Accordingly, the Applicants respectfully request reconsideration of this application and its early allowance.

If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Mr. Keith Taboada at (732) 530-9404 so that appropriate

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arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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KEITH TABOADA
Attorney Reg. No. 45,150
(732) 530-9404

Patterson & Sheridan, LLP
595 Shrewsbury Avenue
Suite 100
Shrewsbury, NJ 07702